



Decontamination and Recycle of Concrete



Developer: Dow Environmental, Inc.
Contract Number: DE-AC21-93MC30166
Crosscutting Area: N/A

Deactivation & Decommissioning FOCUS AREA

Problem:

The technical, regulatory, environmental and economic issues involved in the decontamination and decommissioning of Department of Energy (DOE) facilities provide strong drivers for waste minimization. Technologies are needed that provide effective separation of hazardous constituents from structural and process equipment in a manner that minimizes their volume and allows for safe and economical disposal. The need to dispose of an enormous

quantity of structural concrete at various DOE facilities requires innovative technology solutions to reduce time and cost and potential safety and environmental concerns.

Solution:

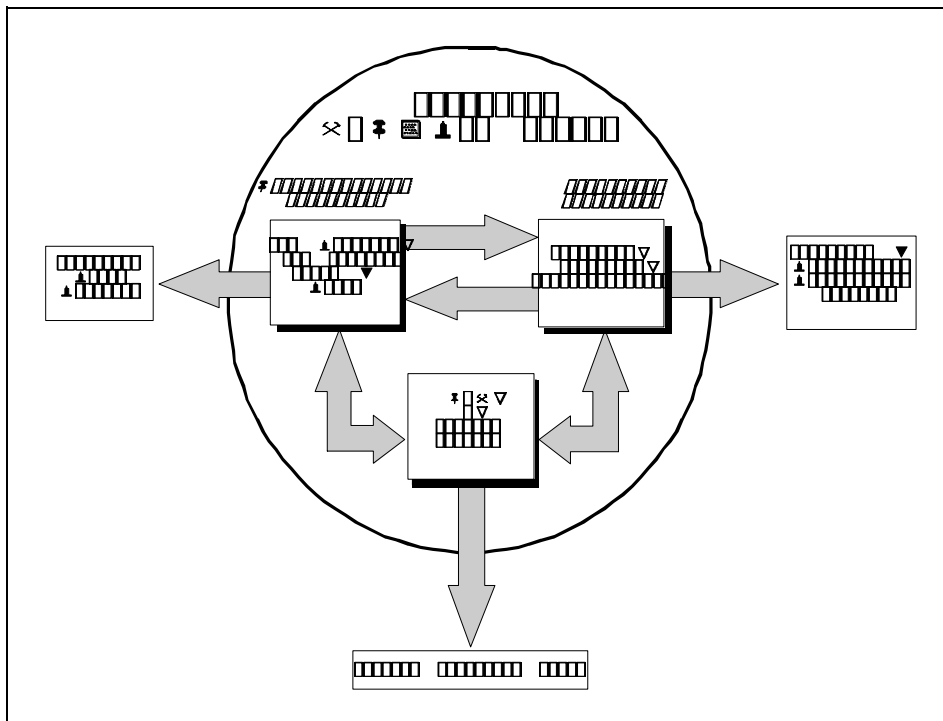
Development and demonstration of a concrete treatment system (AWD-CON) which integrates decontamination and separation subsystems to provide effective and efficient alternatives to current methods.

Benefits:

- Integrated process maximizes concrete cleanup and minimizes cost and time requirements
- Potential for efficient in-situ removal of a variety of contaminants - uranium, PCBs, chromates, etc.
- Reduced primary- and secondary-waste volumes and the resulting need for treatment
- All system components are proven and commercially available
- Potential for application to piping and process equipment

Technology:

This project integrated and demonstrated decontamination and separation technologies, which have been proven in other applications, for concrete decontamination and reuse. The project focused on developing an efficient and cost-effective system, which also minimizes primary and secondary wastes. The integrated system is called AWD-CON, a proprietary process. This system has two major subsystems, one for decontamination and the other for separation,



including collection and treatment of all waste streams. Where appropriate, waste streams are recycled into the process.

The decontamination subsystem includes: dry vacuum cleaning with HEPA filtration, dust collection, foam cleaning agent application, low- and high-pressure surface rinsing, and surface concrete removal using high-pressure water.

The separation subsystem provides coarse solids screening, oil and grease collection, fine solids removal, and organic compound removal using activated carbon.

Project Conclusion:

The project was concluded in January 1997. Dow completed phase one of the subject contract, which included: characterization of concrete at the demonstration site, component acquisition and testing, decontamination and separation subsystem integration, and full-scale integrated system testing. Due to the schedule constraints, the actual contaminated concrete samples from the demonstration site were not collected but simulated based on the data available from Oak Ridge/K-25.

During the integrated full-scale testing, approximately 50 percent of the technetium was removed and removal efficiency for uranium was predicted to be significantly higher than that of technetium. The separation subsystem completely removed the technetium from the washwater, thus allowing the recycle and reuse of water. The system was

not optimized to maximize the contaminants removal efficiencies.

Dow has projected a production decontamination unit can be operated at the rate of 250 square feet per hour at a cost of about \$25 per square foot.

Based on the field and laboratory results of this project, as well as its constraints, additional testing at the DOE facility is needed to better define the system performance in a remediation setting with actual radionuclide species of concern. However, because of other competing technologies and limitation of funds, the project was discontinued.

Contacts:

Dow Environmental, Inc., a subsidiary of The Dow Chemical Company, offers environmental remediation services and develops commercial applications of Dow's technologies and management approaches for hazardous waste remediation. For information on this project, the contractor contact is:

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DOE's Federal Energy Technology Center supports the Environmental Management - Office of Science and

Technology by contracting the research and development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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